



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,396	04/08/2004	Chung-Hui Chen	TS01-1339	8456
42717	7590	06/01/2006	EXAMINER	
HAYNES AND BOONE, LLP 901 MAIN STREET, SUITE 3100 DALLAS, TX 75202			ALANKO, ANITA KAREN	
			ART UNIT	PAPER NUMBER
			1765	
DATE MAILED: 06/01/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/820,396

Applicant(s)

CHEN, CHUNG-HUI

Examiner

Anita K. Alanko

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 3/13/06 election.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 29-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/21/04</u> . | 6) <input type="checkbox"/> Other: _____  |

***Election/Restrictions***

Applicant's election of Group I, claims 1-28 in the reply filed on 3/13/06 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-9, 12-13, 17-19, 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, the term "pad oxide" is unclear because it is unclear what the pad oxide is used for.

In claim 4, the term "a metal" appears to lack proper antecedent basis. Does this refer to the "inductor material" in claim 2?

In claim 5, the term "high" is a relative term that renders the metes and bounds of the claim unclear. Neither the specification or the prior art has clearly defined what a "high etch sensitivity" is.

In claims 6 and 17, the term "slope" is unclear. Does this refer to the result of the etch, that there are sidewalls that are curved?

In claims 7 and 18, the term “slope etcher” is unclear. Does this refer to an etchant that produces a cavity with sidewalls that are curved?

In claims 13 and 23, the members of the Markush group are unclear.

Claims 3, 8-9, 12 and 19 fail to cure the indefiniteness of their base claim, and are therefore also rejected.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Begley et al (US 6,211,056 B1).

Begley discloses a method for the creation of a suspended inductor 242, comprising the steps of:

providing a substrate 238;

creating an inductor in or adjacent to the surface of a layer of dielectric 236, 247 overlying the surface of said substrate (Fig.1);

exposing surface areas of said layer of dielectric (by mask 245, Fig.4); and

etching the exposed surface area of said layer of dielectric (col.4, lines 46-49), thereby creating an air gap in said layer of dielectric, said air gap surrounding said inductor (Fig.5).

---

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Begley et al (US 6,211,056 B1) in view of Zhao et al (US 2002/0148807 A1).

As to claims 2 and 15, Begley discloses to deposit a dielectric layer 236 and an etch stop material 247, patterning and etching the etch stop (Fig.3), etching the dielectric (Fig.1) and filling said pattern with an inductor material 242 (Fig.1). Begley fails to explicitly disclose to create a layer of pad oxide.

Zhao teaches that methods for forming suspended inductors surrounded by air may comprise conventional CMOS processes ([0017]). Therefore it would have been obvious to one with ordinary skill in the art to form a pad oxide as part of a conventional CMOS process in the method of Begley since Zhao teaches that this is useful to do when forming suspended inductors surrounded by air.

As to claim 3, Begley discloses to at least partially remove the etch stop layer (Fig.3, during etch-back.)

As to claims 4, 9 and 13-14, Begley discloses to form pillars 248 (Fig.7) or 112, 114, 116 (Fig.15, which includes creating patterned and etch overlying layers of semiconductor polysilicon material).

As to claim 5, the etch has high etch sensitivity since the dielectric is etched (Fig.5).

As to claims 6-7, the etch uses an etchant that produces a cavity with a slope (both vertical and at an acute angle to the top surface, Fig.5).

As to claim 8, Begley fails to disclose the specific etchant cited. Zhao teaches that HF etchants are known and useful for forming devices suspended over a trench ([0005]). BOE are also conventional. Concentrations, time and temperature of the etchant species determine the type and speed of etch. It would have been obvious to use the etchant cited in the modified method of Begley because Zhao teaches that HF etchants are useful, BOE are conventional, and varying to the composition, time and temperature cited since they appear to reflect result-effective variables, which can be optimized. See MPEP 2144.05 IIB.

As to claims 11-12, Begley does not disclose the thicknesses of the layers, however they are expected to be similar since the same steps are disclosed as in the instant invention, for forming a device with the same characteristic of reduced parasitic capacitance affecting high frequency responses (col.2, lines 1-7). The thickness determines the characteristics of the final product. Therefore, it would have been obvious to one with ordinary skill in the art to form the layers to the thicknesses cited in the modified method of Begley since the same product is formed and the thickness appears to reflect a result-effective variable, which can be optimized. See MPEP 2144.05 IIB.

As to claims 16-28, see the rejection of claims 2-15.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art shows suspended inductors and etching techniques.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 2:30 pm (Wed until 11:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Anita K. Alanko*  
Anita K Alanko  
Primary Examiner  
Art Unit 1765